IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
AT CHARLESTON

IN RE ETHICON, INC., PELVIC REPAIR SYSTEM PRODUCTS LIABILITY LITIGATION	**Master File No. 2:12-MD-02327** **MDL 2327**
THIS DOCUMENT RELATES TO: **WAVE 2 CASES**	**JOSEPH R. GOODWIN** **U.S. DISTRICT JUDGE**

MEMORANDUM OF LAW IN SUPPORT OF DEFENDANTS' MOTION TO EXCLUDE THE OPINIONS AND TESTIMONY OF PAUL J. MICHAELS, M.D.

Defendants Ethicon, Inc. and Johnson & Johnson (collectively, "Ethicon") submit this memorandum in support of their motion to exclude the testimony of Dr. Paul J. Michaels. The cases to which this motion applies are identified in Ex. A to the motion.

INTRODUCTION

Dr. Paul Michaels is a pathologist designated by Plaintiffs to offer general and case-specific opinions in certain Wave 2 cases. Although he has little experience analyzing pelvic mesh, Plaintiffs offer his testimony with respect to pelvic Ethicon mesh products, including TVT, TVT-O, TVT-Secur, Gynemesh PS, and Prolift (collectively, "Ethicon mesh products").

Prior to his retention as an expert for Plaintiffs in pelvic mesh litigation, Dr. Michaels had examined only around two dozen mesh explants over a seven or eight year period. Ex. B, Michaels General Dep. 12:19-13:1. He has no specific training regarding polypropylene mesh—much less the Prolene mesh at issue in this litigation—or its reaction to tissues after implantation. *Id.* at 14:18-15:2. He has never authored any papers, conducted any research, or lectured on the impact of polypropylene mesh on tissue in the pelvic floor. *Id.* at 15:3-14.

Indeed, Dr. Michaels admits that prior to his work in this litigation:

- he knew nothing about the degradation of polypropylene mesh in the body, other than his general belief that polypropylene sutures could degrade, and he had no knowledge of Prolene sutures or mesh degrading *in vivo* (*id.* at 52:4-53:8);

- he never analyzed polypropylene to determine the extent to which it may have degraded *in vivo* (*id.* at 54:3-7);

- he had never studied the mechanisms of degradation of any polypropylene material in the body (*id.* at 55:7-56:9); and

- the alleged mechanism between inflammation and pain is "extremely complex and not something that I, as a pathologist generally would report or describe" (*id.* at 98:11-24).

Despite his lack of knowledge pertaining to pelvic mesh and Ethicon mesh products, Dr. Michaels seeks to offer general causation opinions in this litigation, including:

- Ethicon mesh products degrade, become embrittled, and lose their mechanical properties *in vivo*, causing complications including an increased inflammatory response and increased scarring;

- Ethicon mesh products contract, shrink, and deform *in vivo*, resulting in complications like erosions, scarring, and chronic pain;

- Ethicon's internal documents and testimony by Ethicon employees demonstrates that they Ethicon was aware of the alleged flaws in Ethicon mesh products, including its alleged propensity to degrade, contract, and cause complications.

Dr. Michaels bases these opinions largely on literature and case materials provided by Plaintiffs' counsel. He also reviewed expert reports and deposition transcripts supplied by Plaintiffs—including those of another pathologist for Plaintiffs, Dr. Vladimir Iakovlev—in formulating his opinions. *See id.* at 68:18-69:10; 73:21-74:2. Dr. Michaels reviewed materials pertaining to Dr. Iakovlev's opinions "since he's a pathologist expert in this litigation as well [and] I wanted to see the types of questions that he was being asked." *Id.* at 72:19-73:1. Although Dr. Michaels claims that he also conducted independent research, he cannot identify those authorities or distinguish them from those Plaintiffs provided. *Id.* at 19:2-8.

In other words, Dr. Michaels developed his general causation opinions solely for the

purposes of this litigation based on materials he acquired from Plaintiffs.[1] As discussed below, none of Dr. Michaels opinions are sufficiently reliable to survive scrutiny under *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). For this reason, the Court should preclude Dr. Michaels from offering his testimony at trial.

ARGUMENT

Ethicon incorporates by reference the standard of review for *Daubert* motions as articulated by the Court in *Edwards v. Ethicon, Inc.*, No. 2:12-CV-09972, 2014 WL 3361923, at *1-3 (S.D. W. Va. July 8, 2014).

I. The Court Should Exclude Dr. Michaels's Degradation Opinions.

Dr. Michaels seeks to opine that the Prolene in Ethicon mesh products degrades *in vivo*. Specifically, he seeks to inform the jury that the human body's inflammatory response to the mesh triggers an oxidative burst of free radicals and peroxides that degrade the surface of the mesh. Ex. C, Michaels Report at 5.[2] He claims that the degraded mesh becomes embrittled, forms cracks on the surface, and loses mechanical properties. *See id.*; *see also* Ex. B, Michaels General Dep. 63:2-9. He further opines that this degradation causes increased inflammation, scarring, and other complications in patients. *See id.*; *see also id.* at 60:5-10. But none of Dr.

[1] Ethicon is aware that the Court has declined to exclude expert opinion solely on the basis that it is driven by litigation. *See Sanchez v. Boston Sci. Corp.*, No. 2:12-CV-05762, 2014 WL 4851989, at *4 (S.D. W. Va. Sept. 29, 2014). The Court has explained, however, that the opinion must be otherwise reliable, and that in determining whether an opinion is reliable, the Court can properly consider "[w]hether [the] experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying." *Id.* (citation omitted). Here, Dr. Michaels's degradation opinions are not a natural or direct product of his independent research, because he admittedly had no specialized knowledge regarding the alleged degradation of Prolene mesh prior to his retention by Plaintiffs. Indeed, he formulated his degradation opinions solely through his work in this litigation and after reviewing the selected literature and case materials Plaintiffs chose to provide him. And, as described in greater detail below, Dr. Michaels's degradation opinions are not otherwise reliable because they are not based on scientifically sound methods or literature. The Court should exclude his opinions on this basis.

[2] Although Dr. Michaels did not submit a general expert report, he included general causation opinions in the opening sections of his case-specific reports. As each of these opening sections are nearly identical, for simplicity, Ethicon will refer only to his report in the *Childress* case unless otherwise indicated.

Michaels's opinions are based on a reliable scientific methodology.

A. Dr. Michaels's Opinion that the Prolene in Ethicon Mesh Products Degrades *In Vivo* Is Unreliable.

1. Dr. Michaels's General Experience as a Pathologist Is Not An Adequate Basis for His Degradation Opinions.

Dr. Michaels bases his opinion that Ethicon mesh products degrade *in vivo* on his general pathology experience. Yet, his testimony demonstrates that his experience has not provided him with the specialized knowledge necessary to offer that expert testimony. *See* Fed. R. Evid. 702.

Before this litigation, Dr. Michaels's knowledge of degradation was limited to his general belief that sutures composed of generic polypropylene could degrade *in vivo*. Ex. B, Michaels General Dep. 52:4-19 (admitting that he did not recall reading anything about the alleged degradation of pelvic mesh prior to his retention). He had no knowledge of "the biochemical consequences or mechanisms" of degradation; the extent of his understanding was "just that [polypropylene sutures] can" degrade. *Id.* at 53:18-22. Dr. Michaels admitted that this knowledge was not based on any scientifically validated methodology, but rather his observations from a single abdominal surgery and a general "discussion in the past" about suture materials. *See id.* at 54:8-55:6; *see also id.* at 55:12-56:9 (admitting that he has never studied the mechanism of degradation and stating only that "there have been probably basic discussions" on that issue).

Significantly, Dr. Michaels conceded that even this limited understanding did not extend to sutures composed of Prolene—the material from which Ethicon mesh products are made. *Id.* at 52:20-53:8.[3] It cannot be said that offering an opinion based on products that are different than

[3] Ethicon is aware that this Court has previously questioned whether there is evidence that Prolene is distinct from other forms of polypropylene. *See Huskey v. Ethicon, Inc.*, 29 F. Supp. 3d 691, 703 (S.D. W. Va. 2014). However, even experts for Plaintiffs have admitted that Prolene is different from other forms of polypropylene because it contains proprietary antioxidants. *See, e.g.*, Ex. D, *Huskey* 8/25/2014 Trial 156:14–18; 157:11–17 (Dr. Scott Guelcher—plaintiff's biomaterials scientist—conceding that Prolene's antioxidant package makes it unique from other forms of polypropylene); *see also* Ex. E, Guelcher 3/23/16 Dep. 87:23-88:9 (same).

the product at issue—here, the Prolene used in Ethicon mesh products—is consistent with the "intellectual rigor" employed by pathologists outside the courtroom. *See Marsh v. W.R. Grace & Co.*, 80 F. App'x 883, 886 (4th Cir. 2003) (quotations and citation omitted).

2. Dr. Michaels's Degradation Opinions Are Not the Product of Reliable Testing or Analysis.

a. Dr. Michaels did not conduct the testing required to establish degradation, embrittlement, or lost mechanical properties.

As even Plaintiffs' polymer scientists explain, it is necessary to conduct certain tests—including Fourier transform infrared spectroscopy, scanning electron microscopy ("SEM"), gel permeation chromatography, and tensile strength testing—to determine whether a polymer has degraded. *See* Ex. F, Mays Dep. 47:16-49:7 (identifying tests that can assess degradation); Ex. G, Jordi 10/30/13 Dep. 173:25–174:8 (admitting that test results showing no loss of molecular weight suggests that there is no degradation of polypropylene).

Dr. Michaels did not run any of the tests required to detect degradation. *See, e.g.*, Ex. H, Michaels *Carter* Dep. 60:8-20 (did not conduct SEM, transmission electron microscopy ("TEM"), or analytical chemistry testing); Ex. I, Michaels *Chrysler* Dep. 55:6-17 (did not conduct SEM, TEM, or mechanical testing). Nor does he identify any reliable studies establishing that Prolene degrades, becomes embrittled, or loses mechanical properties *in vivo*. *See infra* at § I.B.

b. Dr. Michaels's subjective analysis is insufficient to establish that Prolene becomes embrittled or loses mechanical properties.

Despite failing to run the tests required to determine whether Prolene has become embrittled or lost mechanical properties, Dr. Michaels nonetheless seeks to offer those opinions based on his gross examination of about "two dozen" mesh explants not at issue in this litigation. In fact, Dr. Michaels testified that his embrittlement opinion is based solely on his "examination of the gross specimens in the past[.]" Ex. B, Michaels General Dep. 64:14-65:10 (admitting that

he "didn't examine any of the[] specimens [in this litigation] grossly."). Similarly, he seeks to base his opinion that Ethicon mesh products lose mechanical properties on how mesh "felt" after explantation as it compares to his memory of how other mesh "fe[lt] like and function[ed] like before" implantation. *Id.* at 66:17-67:8.

Notably, Dr. Michaels has not produced any of the non-litigation pathology samples, or the pathology reports pertaining to those samples, to Ethicon. *Id.* at 65:11-19. And while Dr. Michaels claims that "most" of the meshes he has grossly examined were Prolene meshes, this assertion is speculative guesswork based on his memory of operative reports. *See id.* at 67:9-68:5 (admitting that he "didn't do a particular count" of the meshes). These opinions constitute the same sort of unreliable and irrelevant testimony that this Court has repeatedly excluded. *See, e.g.*, Ex. J, *Lewis v. Ethicon*, 2:12-cv-04301, MDL No. 2327, 2/12/14 Trial 18:19-19:3; *Lewis v. Ethicon*, 2014 U.S. Dist. LEXIS 15351 (S.D. W. Va. Jan. 15, 2014).

In addition, Dr. Michaels failed to base his opinions regarding embrittlement or the loss of mechanical properties on a proper scientific methodology. Dr. Michaels did not conduct any testing using objective criteria or subject to a known failure rate, subject his findings to peer-review, or follow a generally accepted methodology for determining whether a substance has become embrittled or lost mechanical properties. *See, e.g.*, Ex. B, Michaels General Dep. 65:6-7 (explaining that he did not "biochemically" analyze the gross mesh specimens). Significantly, Dr. Michaels could not identify any specific mechanical property that Ethicon mesh products supposedly lose due to degradation. *Id.* at 65:20-66:11.

Instead, Dr. Michaels's opinions are based merely on his subjective assessment as to how certain mesh explants "felt" versus his recollection of how other mesh "felt" before it was implanted. *See id.* at 64:14-19; 66:17-67:8. He testified that he has not held certain Ethicon mesh products in many years, and he has never held others. Ex. H, Michaels *Carter* Dep. 37:20-38:6

(testifying that he had not held a TVT since medical school, and he could not recall ever holding a Prolift). Thus, even where Dr. Michaels had previously "felt" a pristine version of the mesh, his gross examination was many years removed from that time.

Furthermore, Dr. Michaels admitted that "half" of the two dozen meshes he grossly examined had previously been treated with formalin. Ex. B, Michaels Gen. Dep. 41:16-42:1. In other words, half of the mesh explants on which Dr. Michaels seeks to base his opinions that Ethicon mesh products become embrittled and lose mechanical properties had been already been subjected to a chemical used to stiffen and fix specimens as a part of the sample preparation process.

Dr. Michaels's subjective and speculative opinions simply do not satisfy the requirements of *Daubert*. *See Oglesby v. Gen. Motors Corp*., 190 F.3d 244, 249 (4th Cir. 1999). Accordingly, the Court should preclude him from offering his opinions at trial.

c. Dr. Michaels's Use of Polarized Light Microscopy is Not Reliable.

Dr. Michaels claims that he can observe a layer of degraded Prolene, which he refers to as "bark," using polarized light microscopy. *See, e.g.,* Ex. C, Michaels Report at 9, 17. Dr. Michaels bases his approach on the work of Dr. Iakovlev and an internal Ethicon document. *See, e.g., id.* at 5 (citing ETH.MESH.15955462); Ex. H, Michaels *Carter* Dep. 62:2-8; Ex. K, Michaels *Childress* Dep. 68:15-21. Yet, neither of these sources constitute a reliable basis for Dr. Michaels's use of polarized light to determine whether Ethicon mesh products degrade.

To the extent Dr. Michaels bases his opinions on Dr. Iakovlev's work, his opinions are unreliable for the same reasons discussed in Ethicon's motion to exclude Dr. Iakovlev's opinions and testimony. *See* Notice of Adoption of Prior *Daubert* Motion of Dr. Vladimir Iakovlev, M.D. for Wave 2; *see also* Mem. Supp. Mot. to Exclude the Opinions and Testimony of Dr. Vladimir Iakovlev, *In re Ethicon, Inc.*, MDL 2327, No. 2:12-cv-01267 [ECF 2070].

Dr. Michaels's reliance on a 32-year old internal Ethicon test is equally unfounded, because that test is subject to the same criticisms as Dr. Iakovlev's methodology. Specifically, the researchers in the 1984 test failed to run a control experiment to validate the underlying hypothesis that degraded Prolene would hold stain. *See* Ex. L, ETH.MESH.15955462. Dr. Steven MacLean—an expert for Ethicon—and his team of scientists performed such a control experiment, and invalidated the hypothesis advanced in the 1984 test. *See* Ex. M, Expert Report of Dr. Steven MacLean, at 53-71; *see also* Ex. N, S. Benight, *et al.*, *Microscopy of Intentionally Oxidized Polypropylene-Based Mesh Material*, Soc'y of Plastics Engineers (May 2016).

There is simply no scientifically valid testing to support this opinion. Accordingly, the Court should preclude Dr. Michaels from offering this opinion at trial.

3. The scientific literature on which Dr. Michaels relies does not support his degradation opinions.

Dr. Michaels also seeks to base his degradation opinions on certain studies and internal Ethicon documents. Ex. C, Michaels Report at 5. He admitted, however, that he could not recall having seen any of the materials on which he now relies prior to his work for Plaintiffs, Ex. B, Michaels General Dep. at 57:9-24, and conceded that he cannot identify any studies that he found through independent research, *id.* at 19:2-8. More importantly, these studies do not stand for the proposition that Prolene implanted in the pelvic floor is subject to degradation.

a. Dr. Michaels relies on studies that do not address Prolene.

Not Prolene and Speculative. Dr. Michaels seeks to base his degradation opinions on a study by Costello. Ex. C, Michaels Report at 5; *see also* Ex. O, C.R. Costello, *et al.*, *Characterization of Heavyweight and Lightweight Polypropylene Prosthetic Mesh Explants From a Single Patient*, 14 Surg. Innov. 168 (2007). Although the study involved a polypropylene mesh manufactured by Ethicon, closer examination of the study demonstrates that it does not support Dr. Michaels's opinion that Prolene degrades in the human body.

The Costello study analyzed three different hernia mesh explants: (i) Gore-Tex; (ii) a heavyweight polypropylene mesh manufactured by Bard; and (iii) Proceed, an Ethicon mesh composed of Prolene coated with oxidized cellulose. Ex. O, Costello, at 169-70. Although the study found evidence that the Bard mesh degraded, it reported no such evidence for the Ethicon mesh. *Id.* at 172-75.[4] In fact, the study reports that the Ethicon "specimen did not possess *any* visible surface degradation." *Id.* at 175 (emphasis added). Indeed, all of the findings reported by the study about the degradation of polypropylene are actually limited to the Bard mesh.

Cannot confirm either oxidation or Prolene. Dr. Michaels relies on a 2010 study by Clave to support his opinion that Prolene is subject to oxidative degradation. *See* Ex. C, Michaels Report at 5; *see also* Ex. P, A. Clave, *et al.*, *Polypropylene As A Reinforcement In Pelvic Surgery Is Not Inert: Comparative Analysis of 100 Explants*, 21 Int. Urogynecol. J. 261 (2010). But the Clave study, encompassing 100 meshes from multiple manufacturers, expressly states that while there are many "hypotheses concerning the degradation of the PP . . . [n]one of these, particularly direct oxidation, could be confirmed in this study." *Id.* at 266.

Not Prolene and Not Pelvic Mesh. Dr. Michaels relies on a study by Wood to support his degradation opinions. *See* Ex. C, Michaels Report at 5; *see also* Ex. Q, A.J. Wood, *et al.*, *Materials Characterization and Histological Analysis of Explanted Polypropylene, PTFE, and PET Hernia Meshes from an Individual Patient*, 24 J. Mater. Sci. Mater. Med. 1113 (2013). Yet, nothing in the Wood study suggests that it analyzed Prolene. Furthermore, the study expressly states that it analyzed hernia meshes, not meshes used in the pelvic floor.

[4] Indeed, the study reported that scanning electron microscopy "revealed features identical to those of the pristine" Prolene Soft comparator, *id.* at 172; differential scanning calorimetry testing showed no statistically significant difference in melting temperature, *id.* at 173; thermogravimetric analysis testing showing "almost identical" values for the Proceed explant and pristine Prolene Soft sample, *id.* at 174; and histological examination revealed "minimal fibrotic tissue around the mesh" explant composed of Proceed, *id.* at 174.

b. Dr. Michaels relies on studies that or are methodologically unsound.

Exposure to Conditions Not Found in the Pelvic Floor. Dr. Michaels seeks to rely on a study by Jongebloed as evidence that Prolene degrades after implantation. *See* Ex. C, Michaels Report at 5; *see also* Ex. R, W. Jongebloed & J. Worst, *Degradation of Polypropylene in the Human Eye: A SEM Study*, 64 Documenta Opthamologica 143 (1986). But this study is inapposite in this case because it addressed sutures that had been implanted in the human eye.

It is undisputed that all forms of polypropylene, including Prolene, oxidize when exposed to ultraviolet radiation. Thus, the fact that ocular sutures—which would necessarily be exposed to ultraviolet radiation—oxidize after implantation in the eye is neither surprising nor germane to the Prolene used in Ethicon mesh products placed in the female pelvic floor.

Unreliable methodology. Dr. Michaels points to a study by Mary to support his opinion that Prolene undergoes oxidative degradation. Ex. C, Michaels Report at 5; Ex. S, C. Mary, *et al.*, *Comparison of the* In Vivo *Behavior of Polyvinylidene Flouride and Polypropylene Sutures Used in Vascular Surgery*, 44 Am. Soc'y Articial Internal Organs J. 199 (1998). But the Mary study's results were the product of an unreliable methodology.

Notably, the Mary study authors did not conduct any molecular weight analysis or test the mechanical properties of the sutures. Rather, the Mary study concluded that the Prolene sutures had oxidized based on FTIR test results showing a peak at $1{,}740^{cm-}$, which "has been assigned to carbonyl stretching, and identifies the presence of surface oxidation, because the chemical structure of both pure polymers are devoid of this functional group." *Id.* at 201. But the authors failed to recognize that $1{,}740^{cm-}$ is also the wavelength for one of the antioxidants used in Prolene, a fact conceded by Plaintiffs' materials scientists. *See, e.g.*, Ex. F, Mays Dep. 104:24-105:3 (admitting that one of the antioxidants used in Prolene has an FTIR signature of $1{,}740^{cm-}$). Thus, the study failed to confirm that the peak at $1{,}740^{cm-}$ was oxidation, rather than a reading of

the antioxidant package used in Prolene.

In addition, the sample preparation process used in the Mary study introduced error into the SEM results. Specifically, the study explains that after explantation, the sutures designated for SEM analysis were treated with either formalin or gluteraldehyde prior to cleaning. Ex. S, Mary at 200. The study ignores the fact that both formalin and gluteraldehyde crosslink with the proteinaceous layer on the fibers to form a hardened shell that can manifest as a cracked layer under SEM. *See* Ex. T, Expert Report of Shelby Thames, at 10, 16-21 (explaining that fixatives used in sample preparation, such as formalin, bond or crosslink with proteins adhered to the surface of an explant to form a hard and brittle shell around the surface of the explant).

Antioxidants work. Dr. Michaels relies on a 1976 study by Liebert to support his opinions that polypropylene is subject to oxidative degradation. *See* Ex. C, Michaels Report at 5; *see also* Ex. U, T. Liebert, *et al.*, *Subcutaneous Implants of PP Filaments*, 10 J. Biomed. Mater. Res. 939 (1976). But, as even other experts for Plaintiffs in this MDL have admitted, the Liebert study actually found that antioxidants are effective at preventing degradation in polypropylene. *See* Ex. V, Guelcher 3/25/14 Dep. 73:16–74:1.

c. Dr. Michaels relies on unpublished Ethicon documents regarding Prolene sutures that do not support his opinion and would be highly prejudicial unless Ethicon can introduce evidence that the FDA approved Prolene sutures for use in the human body.

Dr. Michaels also seeks to base his degradation opinions on certain internal Ethicon documents, but none of the documents he identifies actually supports his opinions. For instance, Dr. Michaels relies on a 1987 Prolene suture test. Ex. C, Michaels Report at 5, *see also* Ex. W, IR Microscopy of Explanted Prolene (Sept. 30, 1987), ETH.MESH.13334286. This test does not support Dr. Michaels's opinion that Prolene is subject to *in vivo* degradation because it did not report a change in molecular weight in the sutures under examination, which Dr. Howard Jordi—one of Plaintiffs' experts—concedes is required to prove degradation. *See* Ex. G, Jordi 10/30/13

Dep. 173:25–174:8 (admitting that test results showing no loss of molecular weight suggests that there is no degradation of polypropylene). Nor did the test make any findings that the sutures' mechanical properties—such as elongation and tensile strength—diminished.

Dr. Michaels also bases his opinion that Prolene degrades *in vivo* on a 1983 Prolene suture test. Ex. C, Michaels Report at 5; *see also* Ex. X, B. Matlaga Ltr. to Dr. A. Lunn (Mar. 23, 1983), ETH.MESH.15955438-73. Yet, as one of Plaintiffs' polymer chemists admitted at deposition, the 1983 suture test only examined one fiber explant. Ex. F, Mays Dep. 99:9-100:8. Plaintiffs' polymer chemist also could not rule out the possibility that the fiber analyzed in the test was damaged during excision. *Id.* at 100:23-101:4.[5]

B. Dr. Michaels's Opinion that Degradation Causes Clinical Complications Is Unreliable.

Dr. Michaels seeks to inform the jury that the alleged degradation of the Prolene in Ethicon mesh products causes clinical complications; namely, an increased inflammatory response and increased scarring. Ex. B, Michaels General Dep. 58:11-59:7. He also asserts that the increased inflammatory response and scarring can "correlate" with certain unspecified clinical symptoms. *Id.* at 59:19-60:13. But Dr. Michaels's opinions do not pass muster under *Daubert* because he lacks a reliable basis for his opinions.

Although Dr. Michaels claims that his opinions regarding the complications allegedly caused by degradation are based on scientific literature, he was unable to identify any such studies. *Id.* at 60:14-20; *see also id.* at 106:6-14 (testifying that he could not remember any studies supporting his opinions regarding clinical complications). And while he pointed to certain studies regarding degradation in his expert report, *see* Ex. C, Michaels Report at 5,

[5] For the reasons discussed in Ethicon's motion to exclude the testimony of Dr. Scott Guelcher, Ethicon submits that Dr. Michaels should not be permitted to offer degradation opinions based on studies regarding Prolene sutures, unless Ethicon can introduce evidence regarding the FDA approval and regulation of Prolene sutures. *See* Notice of Adoption of Prior *Daubert* Motion of Dr. Scott Guelcher for Wave 2; Mem. Sup. Mot. Exclude the Opinions and Testimony of Scott A. Guelcher, Ph.D. [ECF 1981].

examination of those studies reveals that they do not actually support his opinion that the alleged degradation of Prolene causes clinical complications, (*see supra* at § I.A.3.).

Furthermore, Dr. Michaels's opinion that degradation causes clinical complications fails to account for the out-of-court writings of Dr. Iakovlev, who acknowledges that the question remains open. *See, e.g.*, Ex. Y, V. Iakovlev, *et al.*, *Pathology of Explanted Transvaginal Meshes* 512 (2014) ("Polypropylene degradation *may play a role* in the continuous inflammatory response, mesh hardening, and late deformations" and the "chemical products of degradation *need to be studied* for their composition and effect on the tissue.") (emphasis added); Ex. Z, V. Iakovlev, *et al.*, *Degradation of Polypropylene* In Vivo: *A Microscopic Analysis of Meshes Explanted From Patients*, J. Biomed. Mater. Res. Part B (2015) ("[The] exact mechanisms of these late complications are yet to be understood").

The Court should preclude Dr. Michaels from testifying about complications allegedly caused by degradation because his opinions are not based in scientific evidence.

II. Dr. Michaels's Opinions Regarding the Alleged Contraction, Shrinkage, and Deformation of Ethicon Mesh Products Are Unreliable.

Dr. Michaels seeks to testify that Ethicon mesh products contract, shrink, or deform *in vivo*. *See* Ex. C, Michaels Report at 2-4; Ex. B, Michaels General Dep. 39:21-40:5. He claims that such contraction leads to clinical complications, like erosion, scarring, and chronic pain. Ex. C, Michaels Report at 2-4. But Dr. Michaels fails to identify any reliable support for his opinions.

Dr. Michaels's contention that he can look at a pathology slide and infer that mesh contracted or deformed *in vivo* is unfounded. For starters, Dr. Michaels failed to follow the standard methodology used by pathologists for determining how a specimen is oriented in the human body. To ascertain how a specimen was oriented *in vivo*, a pathologist must (i) identify anatomical landmarks, and (ii) consult markers provided by the explanting surgeon. Ex. AA,

William Westra, *et al.*, Surgical Pathology Dissection (2003), at 4; Ex. BB, Susan Lester, Manual of Surgical Pathology (2010), at 7. Specifically, the surgeon must use sutures, tags, or a diagram to designate the orientation (*i.e.*, anterior, posterior, medial, lateral, superior, and inferior positioning) of the specimen. *See* Ex. AA, Westra, at 4; Ex. BB, Lester, at 7. The failure to adhere to this methodology at the time of explantation limits, if not eliminates, the pathologist's ability to determine the *in vivo* orientation of the specimen, and renders conclusions as to its *in vivo* appearance speculative. *See* Ex. AA, Westra, at 4; Ex. BB, Lester, at 7.

Dr. Michaels did not follow this methodology in developing his contraction and deformation opinions. Rather, he simply concluded that a specimen that has a contracted or deformed appearance on examination was also contracted or deformed *in vivo*. But as Dr. Maria Abadi—one of Ethicon's expert pathologists—explained, "if [a mesh] comes [out] folded, it has nothing to do with the way it was positioned *in vivo*," because the explanting surgeon subjects the explant to a variety of forces during the removal. *See* Ex. CC, Abadi 3/31/16 Dep. 99:19-101:9 (without information from the surgeon, orientation of a specimen is "all speculation").

Dr. Michaels's opinions ignore the fact that mesh explants are not representative of *in vivo* mesh placement. He failed to consider the forces applied to a mesh explant during excision, as he made no effort to understand the removal process. *See* Ex. B, Michaels General Dep. 46:22-47:6. Likewise, Dr. Michaels admits that the tissue into which Ethicon mesh products are implanted contracts immediately upon excision. *Id.* at 42:14-43:17 (admitting that once mesh is explanted "it no longer looks the same as when it was in the body"). Nor did he account for the contraction caused by formalin fixation during the sample preparation process.

Dr. Michaels's opinions regarding mesh contracture or deformation are nothing but speculation and should be excluded. *See Rosen v. Ciba-Geigy Corp.*, 78 F.3d 316, 319 (7th Cir. 1996) ("[T]he courtroom is not the place for scientific guesswork").

III. The Court Should Exclude Dr. Michaels's Opinions Regarding the Complications Allegedly Caused By Ethicon Mesh Products As Unreliable.

A. Dr. Michaels's Opinions Regarding Complications Are Not Supported By Reliable Scientific Literature.

Dr. Michaels's opinions regarding the complications allegedly caused by Ethicon mesh products should be excluded because he failed to ground his opinions in reliable scientific literature. As discussed above, none of the studies on which Dr. Michaels relies actually support his opinion that Prolene degrades such that it causes complications. *See supra* at § I.B. Dr. Michaels also failed to identify reliable, peer-reviewed studies showing that complications arise from the *in vivo* contraction or deformation of Prolene mesh. *See supra* at § II.

Dr. Michaels was similarly unable to point to any scientific literature supporting his opinion that patients experience pain due to the adjacency of nerves to Ethicon mesh, or inflammation induced by Ethicon mesh products. Furthermore, Dr. Michaels's opinions are inconsistent with scientific literature directly addressing the opinions he seeks to offer.

1. Dr. Michaels's opinion that Ethicon mesh products cause inflammation that results in pain is unreliable.

Dr. Michaels seeks to opine that patients experienced pain based on his identification of inflammation in histological slides. *See, e.g.*, Ex. C, Michaels Report at 7 & 10 (Fig. 3). But Dr. Michaels admitted that the "mechanism with regards to inflammation and pain is . . . not something that I, as a pathologist generally would report or describe." Ex. B, Michaels General Dep. 98:11-17. And while he offered various *theories* as to how inflammation could cause pain, *see id.* at 99:1-100:5, he admitted that determining how inflammation allegedly causes pain is "not something that I have specifically reviewed in preparation" of his opinions, *id.* at 98:23-24. Yet, Dr. Michaels seeks to inform the jury that it does just that.

Nor did Dr. Michaels identify any scientific or medical literature to support his opinion that the presence of inflammation is sufficient to draw a causal conclusion that a patient suffered

from pain. *Id.* at 106:6-14 (explaining that he could not recall any study analyzing the role of inflammation in causing pain, other than the Hill study that contradicts his opinion). In fact, the only study that Dr. Michaels could recall—the Hill study—actually contradicts his hypothesis that higher levels of inflammation correlate with higher levels of pain.

The Hill study examined 130 explanted meshes, and conducted a histological comparison of the patients who complained of pain and those who did not. Ex. DD, A. Hill, *et al.*, *Histopathology of Excised Midurethral Sling Mesh*, 26 Int'l Urogyncology J. 591, 592 (2015). Contrary to their own hypothesis, the authors found that pain was *not* associated with increased inflammation. *Id.* at 592–93.

Dr. Michaels seeks to avoid the findings of the Hill study by claiming that it was "a really bad study," but his criticisms are baseless and speculative. Ex. B, Michaels General Dep. 102:13-106:5. For instance, Dr. Michaels stated that, because the authors based the study on their review of medical records, they could not rule out the possibility that patients who had pain simply did not report it. Dr. Michaels's criticism makes no sense, because retrospective studies based on medical records are commonplace, and Dr. Michaels did not identify any scientific literature to the contrary. Moreover, Dr. Michaels's counterfactual ignores the simple fact that if the patients in the study had pain significant enough to be documented, it would have been reported. Tellingly, Dr. Michaels failed to identify any authority supporting his criticism of the Hill study.

Dr. Michaels's rejection of the findings of the Hill study is significant because it conducted the analysis that Dr. Michaels has not done—*i.e.*, using a control and comparing the histological reaction of symptomatic and asymptomatic meshes. Dr. Michaels's failure to conduct such an analysis renders his opinions unreliable.

The Court should not permit Dr. Michaels to offer his histological observations as evidence that Ethicon mesh products cause complications where he failed to identify reliable

scientific support, and he rejected literature directly relevant to his opinions.

2. Dr. Michaels's opinion that the presence of a nerve in scar tissue or its proximity to mesh is indicative of pain is unreliable.

Dr. Michaels claims that the distortion and entrapment of nerves in mesh material and scar tissue cause pain. Ex. C, Michaels Report at 3-4. He seeks to inform the jury that the presence of a nerve in scar tissue or its proximity to mesh fibers are sufficient bases to conclude that a patient suffered from pain. *See* Ex. EE, Michaels *Sierra* Report at 6 & 11 (fig. 11).

Dr. Michaels's opinion is unreliable because he failed to identify any scientific literature supporting this assertion. Importantly, the Hill study found no difference in fibrosis between the two groups under examination. *See* Ex. DD, Hill at 593.

Dr. Michaels also reflect a flawed methodology and a misunderstanding of the basic structure and function of nerves. As Drs. Hannes Vogel and Roger McLendon—Ethicon's neuropathologists in this litigation—explain, nerves in the human body are specialized, and only sensory nerve fibers are capable of transmitting pain signals. *See* Ex. FF, Expert Report of Roger McLendon ("McLendon Report") at 9 (explaining function of motor, autonomic, and sensory nerves); Ex. GG, Expert Report of Hannes Vogel ("Vogel Report") at 3–6 (same). Thus, one cannot link a specific nerve to pain without first determining that it is, in fact, a sensory nerve.

Even if it is a sensory nerve fiber, one must identify the sensory receptor to ascertain the type of signal the nerve carries. *Id.* at 6; *see also id.* at 4 (explaining that sensory nerves carry different types of signals); Ex. FF, McLendon Report at 9 (same). Additionally, one cannot draw a conclusion regarding pain without identifying a sensory receptor, because the receptors—not the nerve fiber itself—trigger the transmission of a pain signal. *Id.*; *see also id.* at ¶ 14.

Dr. Michaels's reliance on light microscopy and histological stains does not permit him to make causal conclusions regarding pain. Dr. Michaels bases his pain opinions on his review of slides stained with haematoxylin and eosin ("H&E), as well as immunohistochemical stains like

S100. *See* Ex. EE, Michaels *Sierra* Report at 5 & 11 (fig. 11). But it is not possible to distinguish among sensory, motor, and autonomic nerves based solely on a review of a slide stained with H&E. Ex. B, Michaels General Dep. 78:21-79:10. Indeed, even neuropathologists cannot differentiate between nerve types via light microscopy. *See* Ex. GG, Vogel Report at 6.

In addition, although stains like S100 help identify certain nerve components, they cannot distinguish between nerve types and "do not identify sensory receptors." *Id*. Moreover, while Dr. Michaels observed that there are stains capable of differentiating among nerves, he does not use such stains or conduct any such analysis in this litigation. Ex. B, Michaels General Dep. 79:11-16.

Dr. Michaels's lack of familiarity with the pathophysiology of nerves not only demonstrates a lack of specialized knowledge regarding the issues about which he seeks to testify, it contributed to his failure to apply a scientifically legitimate methodology for concluding that Ethicon mesh products cause pain in women. Although Dr. Michaels's pain opinions are illustrative of the lack of a legitimate methodology underlying his opinions, the inadequacies of his attempt to base causal conclusions on his histology apply with equal force to all of his opinions regarding the alleged complications caused by Ethicon mesh products.

B. Dr. Michaels's analysis is unreliable because he failed to use a control.

Dr. Michaels's opinions that Ethicon mesh products cause complications are based on his histological analysis of explanted meshes. As Ethicon's expert gynecological pathologists and neuropathologists in this litigation have explained, it is inconsistent with the scientific method to offer a causal conclusion based on histological observations in the absence of an asymptomatic comparator. *See* Ex. HH, Expert Report of Teri Longacre at 4–5; Ex. FF, McLendon Report at ¶ 6; Ex. GG, Vogel Report at 14. Dr. Michaels's failure to use a control means that he cannot eliminate the likelihood that the histological presentation of women suffering from pain is the

same as the histology of women not suffering from pain. *See id.* at 14.

This is a significant gap in Dr. Michaels's analysis because if the histology of both groups is the same, his histological findings cannot identify the cause of the pain. The same holds true with respect to all of the complications to which Dr. Michaels opines. Without a proper control, Dr. Michaels's attempt to correlate specific complications with samples of explanted Ethicon mesh products is nothing but conjecture. *See Sanchez v. Bos. Sci. Corp.*, No. 2:12-cv-05762, 2014 WL 4851989 (S.D.W. Va. Oct. 17, 2014) ("Vigorous adherence to protocols and controls are the hallmarks of 'good science.'").

IV. The Court Should Exclude Dr. Michaels's Narrative Summary of Ethicon Documents and Depositions, and His Opinions Concerning Ethicon's Knowledge, State of Mind, and Corporate Conduct.

At several points in his report, Dr. Michaels opines as to Ethicon's alleged knowledge and the content of certain Ethicon documents. For instance, he opines that Dr. Klosterhalfen informed Ethicon in 2006 that "the foreign body reaction to these meshes can occur up to 20 years." *See* Ex. C, Michaels Report at 4. He contends that "Ethicon's documents demonstrate that over the course of Dr. Klosterhalfen's interactions and meetings with Ethicon, he made numerous suggestions aimed at improving the biocompatible nature of mesh implants[.]" *Id.* at 4-5. He also attempts to interpret and characterize the trial testimony by Ethicon personnel. *Id.* at 4.

The Court should preclude Dr. Michaels from offering opinions concerning Ethicon's internal documents, corporate knowledge, and conduct. This Court has repeatedly ruled that an expert's opinions regarding Ethicon's documents and corporate knowledge "are not appropriate subjects of expert testimony because opinions on these matters will not assist the jury." *See, e.g.*, *Lewis v. Ethicon, Inc.*, No. 2:12-cv-4301, 2014 WL 186872, at *5 (S.D. W. Va. Jan. 15, 2014). Although an expert can rely on corporate documents in certain instances in formulating his

opinions, the material quoted above demonstrates that Dr. Michaels seeks to go well-beyond mere reliance by editorializing on Ethicon's alleged knowledge and conduct.

Indeed, Dr. Michaels is not qualified to opine as to Ethicon's corporate knowledge and conduct. Dr. Michaels is a pathologist. His resume does "not include knowledge or even experience in the manner in which corporations and the [medical device] marketplace react, behave or think regarding their non-scientific goals of maintaining a profit-making organization that is subject to rules, regulations, standards, customs and practices among competitors and influenced by shareholders or public opinion." *In re Diet Drugs Prods. Liab. Litig.*, No. MDL 1203, 2000 WL 876900, at 9 (E.D. Pa. June 20, 2000). Dr. Michaels is thus unqualified to offer any opinions concerning Ethicon's corporate conduct.

CONCLUSION

For the reasons set forth above, Dr. Michaels' opinions fail to pass muster under *Daubert* and the Court should therefore limit his testimony at trial.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I certify that on July 21, 2016, I electronically filed this document with the clerk of the court using the CM/ECF system, which will send notification of this filing to CM/ECF participants registered to receive service in this MDL.

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